

APPENDIX D

**HELICOPTER OPERATIONAL
SAFETY ANALYSIS**

Heliplanners

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May 26, 2006

Ms. Nora Monette
Senior Project Manager
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**Subject: Kaiser Permanente Medical Center Relocation, Santa Clara, California
Helicopter Operational Safety Analysis – Revision 1**

Dear Ms. Monette:

Figure 1 depicts the general trend in helicopter accident rate per 100,000 departures on a nationwide basis as reported by a Helicopter Association International analysis¹. (The data applies to accidents *anywhere* during a helicopter flight, not just at the departure end.) The database covers 35 years. While there are bumps in the trend, the overall rate appears to be decreasing. In fact, it has decreased from a high of about ten accidents per 100,000 departures at the start of the period to below four (below three in several years) during the past fifteen years. In fact, the national rate in 2004 was 2.70 accidents per 100,000 departures.

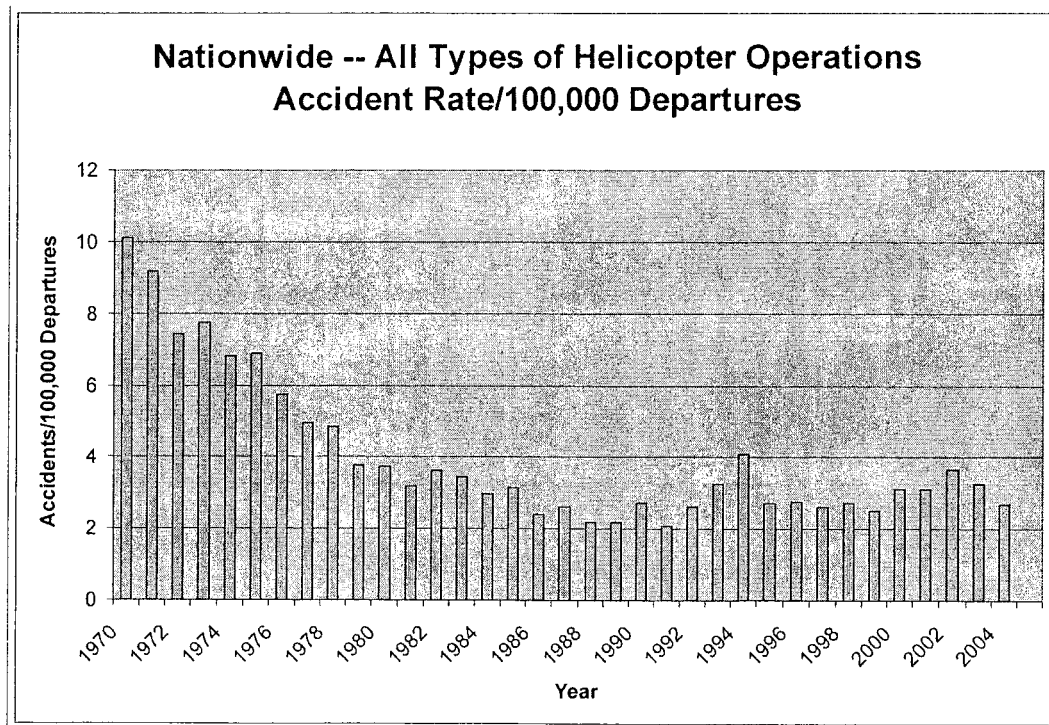


Figure 1.

¹ Source: Helicopter Association International, U.S. Civil Helicopter Safety Statistics-Summary Report (1970-2004). [Website: <http://www.rotor.com/sections.php?op=viewarticle&artid=7>]

It is impossible to know how many helicopter departures Kaiser Santa Clara will experience on a monthly or annual basis until the helistop opens. Helicopter activity at the old campus has been extremely low – approximately nine departures per year. Assuming a somewhat higher activity level of 15 flights per year in the future and applying the national rate to this assumed local activity level yields an estimate of .000405 accidents per year, or about one accident every 2,469 years. To reiterate, this does not mean one accident every 2,469 years in the vicinity of the hospital; it means one accident every 2,469 years *somewhere* along a helicopter's route of travel.

It is important to understand that Figure 1 represents a nationwide database and covers all types of civil (non-military) helicopter operations. Several factors would tend to suggest that the accident probability associated with Kaiser Santa Clara's helistop would be better than the national average. For example, weather should be less of a factor in Santa Clara than in some parts of the country that are subject to much more rain, snow, ice, unfavorable winds, etc.

Also, landings and takeoffs at Kaiser Santa Clara would not include types of operations that might be considered more dangerous but that are included in the national database. These include operations such as instructional, aerial application (crop dusting), external load, aerial observation (such as powerline patrol), etc. Each of these operations types may involve more hazardous characteristics that would not be present at Kaiser. In fact, industry statistics indicate that air medical operations accounted for only about 4.4 percent of *all* civil helicopter accidents during the ten-year period from 1995 through 2004. A classification of accidents resulting from different types of civil helicopter flights during that ten-year period yields the following percentages, with air medical accidents ranking well below some of the other classifications that tend to increase the overall accident rate:

Type of Operation	Percentage
Personal	21.2
Instructional	16.7
Undefined	10.4
Public use	10.1
Aerial application	9.7
External load	6.5
Air taxi (charter)	5.9
Business	5.2
Air medical	4.4
Aerial observation	4.1
Sightseeing	1.8
Commercial air tour	1.7
Utilities	1.4
Electronic news gathering	0.6
Executive/corporate	0.3
Total	100.0

Also, air medical helicopter operators maintain high flight crew hiring standards. Their crews generally have many years of helicopter experience.

Finally, we are concerned here only with operations at one properly designed, fully permitted helistop that meets recognized obstruction-clearance and other safety-related standards. This provides an inherently safer operational environment at the hospital end of a trip than crews might sometimes encounter in other phases of a flight.

All of these factors combine to suggest that the potential accident rate at Kaiser Santa Clara should be lower than the overall national rate.

Additional Reports and Studies

There have been reports of an increasing number of helicopter emergency medical service (HEMS) accidents in recent years. Some of these reports perceive a trend. Writing in the Journal of Trauma in 2004 (A Safety Review and Risk Assessment in Air Medical Transport), Bryan E. Bledsoe and Michael G. Smith identified a “steady and marked increase in the number of helicopter accidents in the United States during the 10-year period 1993-2002”. However, of the 84 medical helicopter accidents they identified, they state that 52% of these occurred during the last three years of the period. In August 2005 the Helicopter Association International (HAI) released a white paper titled Improving Safety in Helicopter Emergency Medical Operations. HAI counts 127 HEMS accidents since 1991. They estimate that the number of helicopters dedicated to air medical service has increased from about 225 flying 162,000 hours in 1991, to over 650 helicopters logging in excess of 300,000 hours in 2005. As in the Bledsoe/Smith studies, HAI does not attempt to assess quantifiable risks. The HAI white paper is primarily concerned with the proportion of accidents that may have been prevented through new regulations and/or operator practices. There was no attempt to identify the significance, if any, of a 36% decrease in estimated flight hours per HEMS helicopter between 1991 and 2005. Similarly, the Bledsoe study states that the observed increase in the accident rate may simply be a result of a marked increase in the number of helicopter operations in the United States and not a decline in operational safety.

In August 2005 the National Transportation Safety Board (NTSB) staff began a special investigation of EMS operations and reported to the Board on January 25, 2006. Although the NTSB investigation looked at accidents involving both airplanes and helicopters, its report cited the HAI statistics discussed above. The staff identified 55 EMS accidents (both airplanes and helicopters) during the three-year period ending in January 2005 to study specific causes upon which to base recommendations to the Board. These recommendations principally involved petitioning the FAA to improve rules and guidelines for EMS operators that would help decrease the incidence of EMS accidents that are deemed preventable. The NTSB also determined that the current data that is needed to identify trends and to evaluate the probability of an accident in a particular EMS operation, such as a hospital helipad, are unreliable at best and unavailable at worst. The NTSB compiles good information about the numerator (that is, the accidents). However, information about the denominator, such as flight hours, numbers and types of operations, etc. are not adequate or not readily available. Accordingly, the NTSB has requested the FAA Helicopter Air Ambulance EMS Accident Task Force to conduct a survey of operators to help provide information for the denominator. This study is expected to be completed approximately by the end of 2006.

NTSB records for the six-year period ending January 1, 2006 show a total of 156 helicopter accidents (not counting less serious “incidents”) within the state of California. They do not show an increasing trend (see Table 1 below). Five (3.2%) of these California helicopter accidents can be considered to be related to emergency medical operations; either by operating to or from an emergency landing site, or by repositioning between a hospital helipad and the aircraft’s home base. Three accidents occurred in remote areas while in route. One each occurred while attempting landing and takeoff operations at emergency sites with impaired visibility and nearby obstructions. None of these accidents involved a permanent, state approved hospital helipad.

NUMBER OF HELICOPTER ACCIDENTS IN CALIFORNIA BY CALENDAR YEAR

Type of Operation	2000	2001	2002	2003	2004	2005	Totals
All	37	29	20	25	24	21	156
EMS	-0-	2	2	1	-0-	-0-	5
Percent	0.0	6.9	10.0	4.0	0.0	0.0	3.2

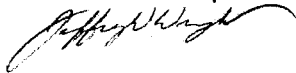
Table 1

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Please call should you have questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey W. Wright", with a stylized flourish at the end.

Jeffrey W. Wright

Aviation Safety Study References

Bledsoe, Bryan E. and Smith, Michael G., Medical Helicopter Accidents in the United States: A 10-Year Review, Journal of Trauma, June 2004.

Federal Aviation Administration, Heliport Design, Advisory Circular AC 150/5390-2B, September 30, 2004.

http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/media/150-5390-2B/150_5390_2b.pdf

Federal Aviation Administration, Objects Affecting Navigable Airspace, 14 CFR 77.

[http://ecfr.gpoaccess.gov/cgi/t/text/text-](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=d057f6006637e671a879c0e988617f8f&tpl=/ecfrbrowse/Title14/14cfr77_main_02.tpl)

[idx?c=ecfr&sid=d057f6006637e671a879c0e988617f8f&tpl=/ecfrbrowse/Title14/14cfr77_main_02.tpl](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=d057f6006637e671a879c0e988617f8f&tpl=/ecfrbrowse/Title14/14cfr77_main_02.tpl)

Helicopter Association International, Improving Safety in Helicopter Emergency Medical Service (HEMS) Operations, August 2005.

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National Transportation Safety Board, Aviation Special Investigation Report - Emergency Medical Services, January 25, 2006.

Synopsis: <http://www.nts.gov/publictn/2006/SIR0601.htm>

Webcast: <http://www.nts.gov/events/Boardmeeting.htm#>